A SPECULATIVE ARCHAEOLOGICAL SEQUENCE FOR NORTH-WEST TASMANIA

by

RHYS JONES,
Department of Anthropology,
University of Sydney

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Tasmania is a mountainous island peripheral to the Australian land-mass, and it is in that direction that we must look for most of the physical and biological relationships (Darlington 1960, p. 659; Jackson 1965, p. 30). On the other hand, many elements of the environment reflect its southerly position, and there are similarities between the west coast of Tasmania and other southern temperate regions such as the South Island of New Zealand, and the west coast of southern Chili.[1] If man came to Tasmania from the Australian mainland, it would be interesting to see, in the archaeological record, what cultural changes occurred in response to the new conditions and also what were the effects, if any, of isolation on prehistoric man and his cultures on the island.

In the last sixty years, there has been a great deal of archaeological work carried out in Tasmania, but most of this has been concerned solely with the amassing of surface collections, and field observations of the sites themselves were rarely recorded. Apart from Meston's work at Rocky Cape, there was no attempt made at excavation. Most of the literature consists of general typological descriptions of stone tools (Noetling 1907, 1910 *b*; Klaatsch 1908; Balfour 1925, 1928; Legge 1929; Meston 1937*b*; Mitchell 1955), or of speculations concerning the cultural status, origin or antiquity of man in Tasmania (Tylor 1894; Noetling 1910*a*; Sollas 1911; David 1924; Pulleine 1928, pp. 296-309; Wood Jones 1935; Meston 1937*a*; Davidson 1937; Tindale 1937, pp. 34-36, 1957 p. 11; Taylor 1950). Mulvaney outlined some of the problems of Tasmanian prehistory (1961 pp. 95-99), and Macintosh and Barker (1965 pp. 1-55) have reviewed the extensive literature on Tasmanian physical anthropology. The standard account of the ethnographic literature has for a long time been that of Roth (1899), but the publication of Robinson's diaries (Plomley 1966) together with new problems posed by archaeological research, calls for a re-analysis of this material. New studies on Tasmanian ethnography have been made by Kemp (brief account in 1963) and Hiatt (1965).

A distribution map of surface collections (Bryden and Ellis 1965) shows that there was prehistoric occupation on all parts of the coastline. The relative paucity of collections from the south west is probably a function of the inaccessibility of the area to collectors. Inland, there are many surface sites in the midlands and in the Derwent Valley; and artifacts have also been found inland from the east coast, in the highlands around the Great Lake, and near the head waters of some of the north coast rivers. This distribution pattern corresponds well with the map compiled by Hiatt (1965, maps 1 and 2, ff. p. 122) of the locations of direct ethnographic observations on the aborigines, and the similarity of prehistoric and ethnographic patterns suggests that the geographical range of the population had been established for some time. Kemp (1963, p. 243) has suggested from her study of surface collections that there are significant differences between assemblages from the west coast, the east coast and midlands, and the Great Lake areas. There may be chronological as well as spatial factors involved here.

The areas not occupied by the aborigines coincide closely with the distribution of the temperate rain forest (Davies 1964, p. 251). Several authors (Gilbert 1959, p. 143; Davies 1964, p. 252; and especially Jackson 1965, p. 33) have shown that fire frequency is an important ecological factor in the relationship of rain forest, wet sclerophyll and sedgeland forms. Jackson says that "where the frequency of fires is high the forest is replaced by open communities of sedgeland and wet scrub with boundaries of wet sclerophyll". Much of the extensive sedgeland on the west coast is believed to be pyrophytic, the disclimax state having been created and maintained by intense aboriginal fire pressure. The sedgeland would have been a much richer hunting and collecting area than the rain forest, which "is distinguished by its stillness and lack of conspicuous life" (Guiler 1965, p. 37). Penetration through the rain forest would have been effected by use of fire-maintained routes or a chain of 'plains' as described by Hellyer at Surrey Hills in 1827 (Meston 1958, p. 40), or by Robinson at the important ochre mines near Mole Creek (28 April, 1832; 16 July, 1834). Stone tools have been found at such small open grasslands in southern Tasmania (Ridpath 1964, p. 347).

1. There are similarities in climate, littoral ecologies (Knox 1960), temperate rain forest flora (Godley 1960; Jackson 1965, p. 33) and sea mammals (King 1964, pp. 23, 78).

At first sight, there seems to be a great dichotomy between the distribution of occupation on the east and west parts of the island, and this has led some authors including Kemp (1963, p. 243) to postulate marked differences in the diet and movement of peoples on the two coasts. Hiatt (1965, pp. 62-65) tabulated the frequencies of direct observations of various foods eaten, and found that the published literature showed a similarity in the diets on the two coasts. On this evidence, at least for the ethnographic present, it is not possible to postulate a largely marine diet on the west coast compared with a mixed marine and land diet on the east. There are large differences between the environments of the east and west, and the archaeological record may reflect this, but it is possible that by using his artifact, fire, the Tasmanian was able to reduce the adverse effect of the rain forest and to create, in a limited way, a more favourable environment.[2]

The most common recognisable archaeological sites are the coastal shell middens. These are very numerous and are found in suitable locations all around the coast. On the east coast, they range in type from thin bands of shell stratified in sand dunes as at Anson's Bay and the northeast generally, to the very large solid shell middens on both banks of the Little Swanport River (Taylor 1892; Crowther 1950, p. 86; Jones 1965 *b* plate 2). There are many middens along the indented shores of Storm Bay and the Derwent Estuary, and Reber (1965) has obtained carbon dates ranging from one to eight millenia from cuts in some of these, though no information was obtained about their stratigraphy or content. The west coast is very exposed and, where overstocking has taken place, there has been severe erosion of the old stable dunes, and the formation of large unstable 'blow out' dunes. Where middens were stratified in the sand, they have been eroded, and there are some areas where the ground is covered with tens of thousands of artifacts and sand etched bones. This is the case on the north part of the west coast between Mt. Cameron West and Sandy Cape, where the excavating activities of the wind have made this a paradise for surface collectors (Pulleine 1928, pp. 310-312; Legge 1928; Crowther 1950, pp. 89-91; and Luckman 1949). On the north coast between Table Cape and Rocky Cape, there are high quartzite cliffs in which there are at least five large caves. The floors and roofs of these caves are respectively about 70 and 100 feet above sea level, and from their position and shape, they are probably old sea caves (Gill and Banks 1956, p. 32; Jennings 1959 *a*, p. 30; Gill 1961, p. 76; Jones 1965 *c*). These caves contain large shell middens.

There is a paucity of recorded stratified inland sites in Tasmania, but, nevertheless, some small occupied rock shelters have been found in the sandstone region of the south-west (Heyward 1934; Jones 1965 *a*, pp. 193 and 198), and more may be found on further search. There are many large stone quarries in the midlands (Noetling 1908, pp. 49-50), and Goede (1965, p. 146) has found a well-made stone tool in gravels near Buckland dated on both geomorphological and carbon dating evidence to the mid-recent period.

Rock carvings have been found on the west coast at Cape Grim (Robinson, 25 June, 1830), Mount Cameron West (Meston 1933; Luckman, L.1951, pp. 25-27; Luckman, J.S.1951, pp. 31-32), Sundown Creek (Ellis and Both, personal comm.), Green's Creek (Robinson, 4 Sept., 1833; Ellis, ms.), Trial Harbour (Jones, J.F.1938) and Port Davey (Reid 1954, pp. 277-278; Ellis, ms.). These are carved on a variety of rock types, and the motifs consist of circles, barred circles and dotted lines. Together, the west coast carvings form a stylistically consistent group. Elsewhere in Tasmania, carvings have been reported at Devonport by Meston (1932), though their authenticity has been questioned by Scott (1932), and a drawing or stencil of a hand was found by de Teliga and Bryden (1958) in the Derwent Valley. Ellis (1963) thinks that rock markings in Tasman Peninsula and the Derwent Valley believed by Reid (1954, pp. 273-277; 1962) to be aboriginal, are due to tree root activity. At the Bay of Fires, on the east coast, there is a long row of flat stones on a midden, which I interpret as an aboriginal stone arrangement. Excavations showed the presence of a second arrangement stratified one foot below the top one (Jones 1965 *d*, pp. 78-79).

Some of the small offshore islands were visited and occupied by the aborigines. Archaeological evidence has been found on Hunter Island (Meston 1936, p. 155), Schouten Island (Crowther 1950, p. 87), Tasman Island (Meston 1936, p. 157) and Bruny Island (Reber 1965, p. 264). There are ethnographic accounts of aborigines on Maria Island (Péron 1809, pp. 212-216), Bruny Island (Cook, January, 1777; Robinson, April to Dec., 1829), and De Witt and Mattsukyer Group (Robinson, 16 July, 1831), and the islands of the north west such as Hunter (Robinson, 13 August, 1832). The watercraft consisted of rafts and catamarans of rolled and bound bark (Meston 1936, pp. 158-161; Hiatt 1965, pp. 98-101), and the channels to be crossed, although in some cases only a few miles wide, would have been dangerous. There is no published evidence for prehistoric occupation of the large Bass Strait islands, although this may yet be found (Tindale 1941, p. 145). The lack of shell middens and other achaeological remains suggests that it is unlikely that these islands were systematically visited in recent prehistoric times.

In planning my field work,[3] I wanted to find sites with a long period of occupation in order to set up a sequence but, apart from setting up a chronological framework, I was also interested in investigating the content of some of the cultures thus isolated. I concentrated my activities on the north-west corner of the island, where I carried out excavations at the north-west coast cave sites of Sisters' Creek, Rocky Cape North and Rocky Cape South and, as a contrast to these, at the large open midden north of the West Point Lighthouse.

Rocky Cape South (Fig. I, C)

This is an eastward facing cave, inclined at 45 degrees from the vertical, in a bedded precambrian quartzite (Cave Quartzite of Spry 1957, p. 83). There is a midden at the entrance and this extends some 100 feet into the narrow crevice. At the present floor level, the cave is six feet wide and five feet high, though Pulleine (1928, p. 310) records how he had to crawl into the cave.

2. A similar use of fire has been described by Cumberland (1962) for prehistoric New Zealand.

3. Carried out in the summers of 1963-64 and 1964-65, under the auspices of the Australian Institute of Aboriginal Studies, and the Department of Anthropology, University of Sydney.

The midden deposit in the cave has been extensively dug (Meston 1956, p. 197); Gill and Banks 1956, pp. 36-40; Reber 1965, p. 267) but the published descriptions of the site were meagre and confusing, and Mulvaney concluded his section on Tasmanian prehistory (1961, p. 99) saying "systematic excavation at Rocky Cape is highly desirable. Until that time, correlations of mainland and insular prehistory are premature". My aim was to isolate and excavate some undisturbed material, and I particularly wanted to test Meston's claim for a 15-foot depth, and Tindale's theory of a typological sequence (1937, p. 34). There was a large collapsed pit immediately under the entrance, and we emptied this out first and cleaned up the side. We then excavated one corner in order to obtain a straight section, and dug an embayment six feet by three into our straight wall.

The maximum depth of undisturbed midden was ten feet, with two feet of disturbed material above this. Below the midden was a coarse gritty sand containing many sharp edged stones, and the junction with the shells was very marked. This sand was packed tight between large angular boulders, some being up to a ton in weight, and we could only excavate two or three feet down in the crevices between these rocks. The sand did not contain any flakes, bones or charcoal.

The midden itself had a complex stratigraphy (Plate 1), but it could be divided into two major units. The bottom complex was six feet thick and consisted of lenses of shelly and brown earthy midden deposits, which had been laid down horizontally. Among the molluscs represented, the 'dog winkle' *(Dicathais textilosa)*, the warrener *(Subninella undulata)*, and the limpet *(Cellana solida)*, were the most common.[4] The *Dicathais* shells were complete, but most of the *subninella* were broken. There were many bones, and the animals represented were seal, wallaby, bandicoot, rat kangaroo, bird and parrot fish. Most of the seals were Southern Elephant Seals *(Mirounga leonina)*, but there were also some Fur Seals *(Arctocephalus* sp.). In order to try and assess their relative numbers, I have calculated for each animal the minimum number killed, by counting the most common bone and dividing this by the frequency of the bone in the complete skeleton. In practice, I have used mandibles for seals and marsupials, sterna for birds, and premaxillae for the parrot fish. In a preliminary count on six spits out of twenty, I have a minimum number of 146 animals killed, of which there are eight seals, four wallabies, two bandicoots, two birds and 130 parrot fish. I have tried to translate the relative frequencies of animals to those of meat poundage, assuming that each young seal contributed 50 pounds of meat,[5] each wallaby 15 pounds,[6] and each parrot fish two pounds. Excluding shellfish, of the order of 55% of the meat came from seal, 10% from marsupials, and 35% from parrot fish.[7]

From the three by six feet embayment in the bottom complex, we obtained artifacts at a density of about 10 flakes per cubic foot, and of these, 7% were retouched implements or cores. Of the raw materials used, 40 to 50% was the local coarse quartzite, 30% a hard red and yellow quartzite, and quartz and basalt each had maximae of 25% in some levels, the quartz steadily replacing the basalt. In the lowest spits, the percentage of coarse quartzite was 65%, and a hard mudstone was also used. All these materials could be obtained from the immediate locality, namely from the walls of the cave, the beach or from a particularly hard outcrop in the local quartzite.

Typologically, the assemblage was crude and relatively undifferentiated, most of the tools being simple retouched flakes. There were some simple unifacial pebbles, and two large cores with alternate flake scars had been utilised. Contrasting with this simple stone assemblage, were 35 bone tools, some of which had been carefully made. These fell into two groups, long single ended points (115-145 mm. long) and spatulae (one was 150 mm. long). Both groups were made on wallaby fibulae which had been snapped in half, the broken edge being ground and polished until smooth. These tools were comparable with surface finds described by Crowther (1925), Meston (1956, pp. 192-195) and Plomley (1962, p. 14). At Rocky Cape, excellent examples were recovered from the base of the midden.

We located the position of Reber's Carbon-14 sample a foot above the base of the midden. This gave a date of 8,120 ± 160 B.P. (Reber 1965, p. 267).

The top complex had a maximum thickness of four feet, and it lay in a wide depression cut into the deposit of the bottom midden. This may have been done deliberately as an attempt to clean out the cave, the headroom being only six feet above the unconformity. The deposit consisted mostly of hard ash, burnt and crushed shells and large nodules flecked with fine charcoal of a soft white deposit.

The shells were of the same species as in the bottom complex. The bone material consisted mostly of small slivers, many of which were burnt, and most were unidentifiable, though fish was present. There were 1,500 stone artifacts at an average density of 60 per cubic foot, though some spits contained 100 per cubic foot. Most of these were tiny flakes and only 2½% had been retouched. The rock types were the same as in the bottom complex and used in similar proportions, with one important exception that in the top complex there were between 3 and 5% of excellent raw materials including cherts and a fine silified breccia. These are exotic to the area, the only source of one of the cherts being on the west coast. The majority of the tools were simple retouched flakes and flaked pebbles as we had found in the lower levels, but there were also a few well-made tools. These were small high domed pieces with a series of retouched concavities around the periphery, and pieces with very steep step-flaked lateral retouch, or steep retouch forming a concave edge. There were no bone tools, but given the fragmentary nature of bone generally, this need not be culturally significant.

People living on a site may light fires, cook, throw away refuse, make stone tools, use stone tools, etc., often in different parts of the site, and the material residue of these activities can differ markedly from each other. At Rocky Cape South, I think that the bottom complex was largely a refuse dump, whereas the top complex was the residue of

4. For identification and nomenclature of the shells, I have followed Macpherson and Gabriel (1962).

5. King says that the weight of an elephant seal pup at birth is 80 pounds (1964, p. 79).

6. Based on field measurements carried out at West Point by A. G. Thorne.

7. This is a crude calculation and it is only intended to give a general impression of the meat diet.

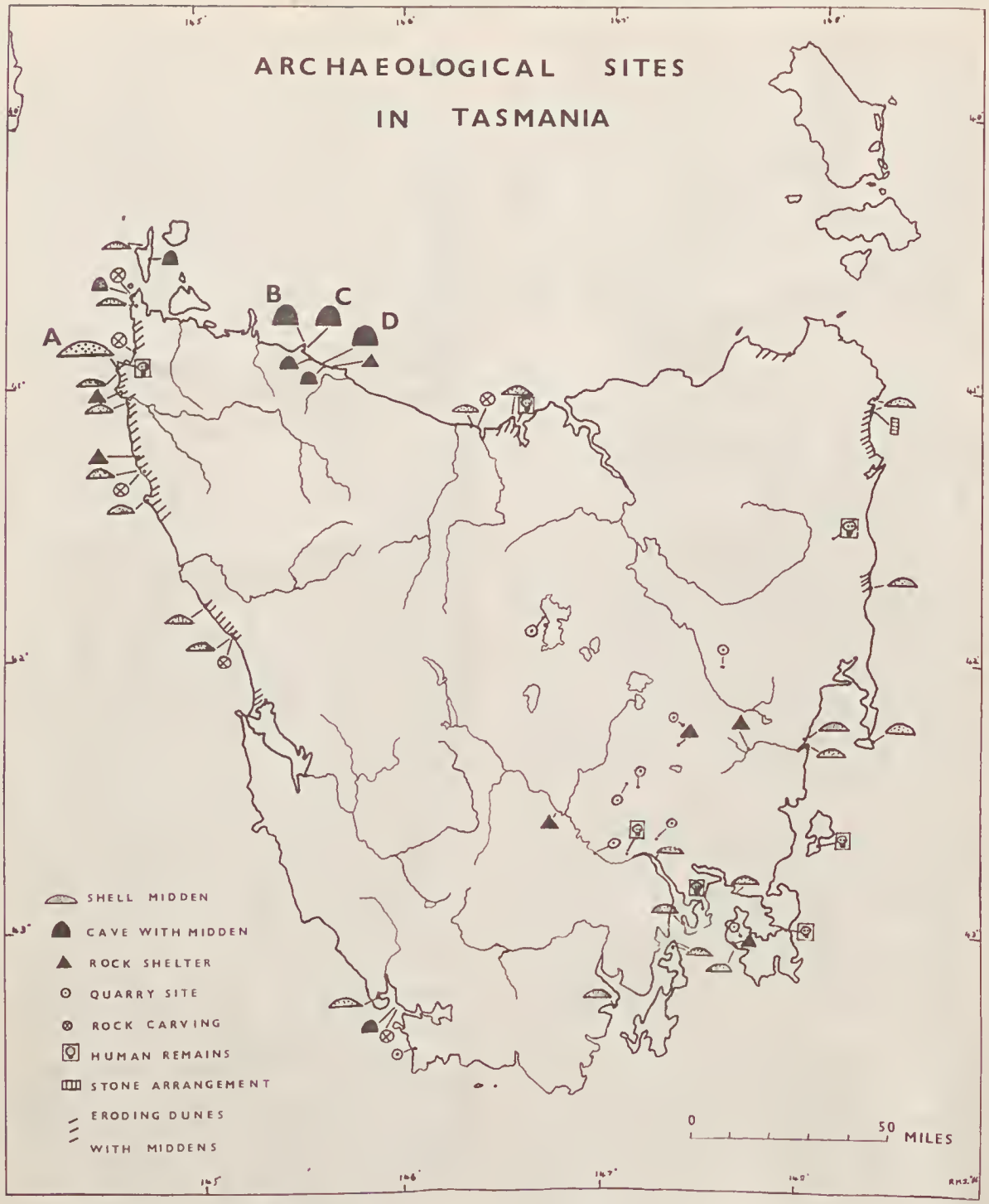

Fig. I.

A West Point
B Rocky Cape North
C Rocky Cape South
D Sisters' Creek

Map of archaeological sites which have either been published or which I can verify by personal observation. I have not included surface collection sites (Bryden and Ellis 1965).

a stone tool manufacturing and hearth area. Assessment of the differences between the two complexes is difficult, because in each case we are dealing with a different aspect of the total economic activity at the site. I think that the differences between the two complexes in ash content, condition of the bones and shell, density of stone artifacts, size distribution of flakes, and proportion of retouched pieces, can be explained in these terms. Elements which are similar in both complexes, such as the species of animals eaten, raw materials used for stone manufacture, and the majority of stone tools suggest continuity of culture. However, the introduction in the top of a small proportion of well-made tools manufactured from good exotic raw materials, implies some culture change.

In my excavations, I did not find a patinated and an unpatinated series (Tindale 1937, p. 34), and I cannot support specific cultural correlations with the Kartan and the Tartangan as suggested by Tindale (1937, pp. 34-36; 1957, p. 11). A general similarity between my finds and certain old mainland assemblages remains an intriguing possibility.

Rocky Cape North. (Fig. I, B)

This is a northward facing slit cave 30 feet high and 200 feet deep situated some 1,000 yards north of the South Cave. We excavated a pit eight feet by four feet, and the maximum depth of undisturbed deposit was nine feet. This rested on two feet of a sterile gritty sand on bedrock. In the bottom two feet of the midden, the shells were similar to those in the South Cave, and there were fish bones with some seal and macropod. The stone artifacts were made of quartzites and rough basalts, and there were a few crudely retouched flakes, with one bone tool. This was similar to the lower levels of the South Cave.

The seven feet of midden above this were quite different. The shells consisted of *Dicathais*, *Subninella*, *Cellana*, and also large quantities of *Notohaliotis ruber* (abalone or mutton fish). Of my sample of animal bones, half were of seal, and there were also wallaby, bandicoot, wombat, possum and bird. Out of the hundreds of bones excavated, there was only one fish bone. I estimate that some 80% of the non-shellfish meat came from seals. Some of the stone material was of local origin, but 30% were imported cherts and breccias. The density of flakes was only five per cubic foot, but the proportion of retouched pieces was high, rising from 9% in the lower part to 16% in the top. Most of the good tools were made of the exotic raw materials, and given the lack of waste flakes, they were probably not manufactured on the site. This stress on imported specialised tools increased as time went on. Among these tools were little disc-like cores with alternate flake scars, often the sharp trailing edge thus formed had been utilised (Fig. II: 7, 8). There were several small domed pieces with steep retouch around a central axis (Fig. II: 11), this retouch often formed a series of concavities around the periphery. There were some small flat circular scrapers (Fig. II: 9, 10), and also a range of well made retouched flakes. There were no bone tools.

There are differences between the two sites of Rocky Cape North and South which because of their proximity and similarity, cannot be explained by geographical or ecological factors. I think that they are due to cultural change through time. My chronological hypothesis is that the top half of Rocky Cape North is younger than any deposit in the South Cave, the latter site becoming abandoned when it had filled up. This hypothesis is being tested by carbon dating.

Mulvaney (in Mulvaney and Joyce 1965, table 6, p. 208) claims that unhafted tools were used exclusively at Rocky Cape throughout its period of occupation. The absence of hafted stone tools in the Tasmanian ethnographic collections and literature is strong presumptive evidence for their absence in the Tasmanian prehistoric record, but one cannot ignore the possibility of the loss of a useful art. The diagnostic criteria for recognising nonhafted tools (*op. cit.*, pp. 172, 189), are subjective as Mulvaney admits, and he does not discuss how these always distinguish hafted from unhafted tools. An example of the sort of difficulty which arises is that the *Juan* knife (Tindale 1957, p. 28; Mulvaney and Joyce 1965, p. 190), the ground edge axe, and the retouched flake figured by Tindale (1957, p. 13), could all be "utilised for hand held purposes." (Mulvaney and Joyce, *op. cit.*, p. 172), yet we know that they were hafted. On the other hand spears have been found in Victoria, with a single or double row of hafted flakes, these being "invariably unretouched fragments of primary flakes, which would escape both typological and archaeological indentification" (Mulvaney 1961, p. 97). The presence of gum on an artifact implies that it was hafted, but the absence of gum tells us nothing because gum can decay very quickly in an archaeological deposit. Mulvaney (1965, p. 189) says that a flake can be termed an "adze (i.e. hafted) only when the stepped flaking or use fracture is present. It is this functional - technological factor which distinguishes the hafted adze from hand held scrapers, Australian or European", yet steep step-flaking is a common trait of Tasmanian stone tools, and several authors "have commented on the presence of adze-like flakes in Tasmania" (Mulvaney 1961, p. 97).

Until objective criteria can be set up for the recognition of unhafted stone tools, I am unable to confirm or refute Mulvaney's interesting suggestion that the prehistoric inhabitants of Rocky Cape lacked knowledge of hafting devices.

Sisters' Creek. (Fig. I, D)

This cave is situated seven miles east of Rocky Cape. It is over 100 feet above sea level, and at the entrance, it is 35 feet wide with the roof six feet above the surface of the talus. Inside, it opens out into a chamber 30 feet wide and 15 feet high, with a small stream flowing from a crevice at the back. We dug a trench 30 feet long and five feet wide extending from just outside the lip of the cave to the inner edge of the midden inside the chamber. Excavations showed that there was a maximum depth of five feet of midden resting on four feet of sand, itself resting on bed rock (Jones 1965 *a*, pp. 193-196).

The deposit deep inside the cave consisted of bands of shell and ash. The yield of stone was low with less than ten flakes per cubic foot, and there were few retouched pieces. This contrasted with the deposit at the cave entrance however, especially immediately under the lip of the overhang. Here we found thick concentrations of a soft sticky white deposit flecked with finely divided charcoal similar to the top complex at Rocky Cape South. There

was a high density of flakes with up to 100 flakes per cubic foot in some spits, and a large proportion of these flakes was very small. The majority of the good stone tools from the site came from this area. Inspection of the stratigraphy showed that the deposits in both parts of the cave were laid down at the same time, and so the differences between them was a function of their position in the cave. The prehistoric inhabitants had sat under the entrance which was sunny yet sheltered, and had done most of their cooking and stone tool manufacture there, the darker wetter part of the cave being used primarily as a refuse area for shells and bones. The different uses to which the different parts of the cave had been put resulted in large variations in the content of the midden, and I hope to be able to quantify some of these. Such an analysis should aid in interpreting some of the differences between the top and bottom complexes in Rocky Cape South.

In the site as a whole, the shells were mostly *Subninella undulata*, *Dicathais textilosa*, *Cellana solida* and *Notohaliotis ruber*, and there were some lenses which consisted entirely of *Notohaliotis*. The bones of parrot-fish were common, and there were many crab claws. Of the mammals, there was a higher proportion of the small animals such as bandicoot, possum, rat kangaroo and rat, than was the case at Rocky Cape, though wallaby, wombat, seal and bird were also present. The seal remains were much less numerous than at Rocky Cape, and consisted mostly of single teeth and some fragments of other bones. All the teeth were of *Otariids*, probably Fur Seals (*Arctocephalus* sp.).

The raw materials for the stone tools were mostly hard quartzites which could have been obtained locally. There was also a small proportion of cherts and silicified breccias. There were some small cores with alternate flake scars, and other cores with flakes having been taken off a single platform. Among the tools were simple unifacial and bifacial pebbles, small domed pieces with steeply retouched concavities around the margin, flakes with steep step-flaked retouch, often with a concave working edge, and a series of flakes with flat retouch (Jones 1965 *a*, pp. 194-195, figs 1 and 2). The best made tools were of cherts and breccias. The majority of the implements however, were flakes or pieces of angular rock with a small amount of retouching or utilisation marks. There were two hone tools, one which had been flaked, and the other had a smooth convex end.

A carbon sample from the base of the midden gave a date of 6,050 ± 88 B.P. (N.S.W. 17).

Comparing the Sisters' Creek material with my proposed sequence for Rocky Cape, I think that it resembles most the top levels of Rocky Cape South. In both, parrot-fish were common, together with land mammal and seal. A large proportion of the stone tools were crude and made on locally obtained raw materials, but there were also typologically comparable specialised tools made on new imported raw materials, and bone tools were present.

West Point. (Fig. I, A)

The midden at West Point forms part of a grass covered hill 300 feet long, 150 feet broad and 20 feet high, and it is situated along the northern margin of a small rocky inlet. There is an extensive intertidal rock platform, and the numerous reefs and offshore islands give some protection against the heavy swells, although the site is exposed to the prevailing westerlies. Inland are several marshy lagoons behind which is a rocky terrain covered with dense coastal scrub.

We dug a transverse trench 40 feet long across the midden, and another at right angles to it (Plate 2). Our maximum depth of shell was eight feet. The deposit consisted of two midden complexes separated by an intermittent sandy band, and these had been laid down on top of and to the seaward side of an old dune. The top midden consisted of dense dark grey midden material with numerous charcoal and ash lenses, and the bottom midden was sandier, though here too, there were lenses of shell and ash (Plate 3). There is some evidence of differences in the diet and stone tool manufacture in these two deposits, but they were not as marked as in the Rocky Cape sites, and for the sake of clarity, I shall confine my comments to the top complex.

About 30,000 stone artifacts were recovered from the whole excavation at a density of up to 50 flakes per cubic foot in places. In the top complex, 95% of these were made from an excellent sponge chert. The source of this chert has never been found, but it could only have come from a few confined localities of Tertiary limestones, possibly in the mountains near Balfour, or near Mt. Cameron West (Spry and Banks [ed.] 1962, Geological map; Sutherland). About 5 to 8 per cent of the flakes had been retouched, and the large number of small flakes suggest that stone implement manufacture took place on the site. Among the implements were disc cores (fig. II: 1, 2), circular and semicircular scrapers (fig. II: 3, 4), steeply flaked concave scrapers and flat slightly curved retouched flakes. Many tools were multipurposed, having two or more working edges on them, and in this situation it is more meaningful to base one's typology on an analysis of the various traits such as concave edges or steep step-flaked edges rather than to try and study the shape of the whole tool (see Mellars 1965, pp. 231-232). These implements from West Point are similar to those from the top levels of Rocky Cape North, and bearing in mind the industrial differences to be expected in such dissimilar sites, I suggest that the two assemblages belong to the same industry (fig. II). At West Point we found a few pieces of utilised bone, but there were no well made tools as in Rocky Cape South.

Throughout the midden, by far the most common shells by weight were of *Subninella undulata* and *Notohaliotis ruber*. These were supplemented by a wide variety of other molluscs. The prehistoric molluscan fauna was the same as the present one, but the different proportions of species in the midden and on the shore show that there was a very strong cultural preference for *Subninella* and *Notohaliotis*. Both these species live in the lower part of the intertidal zone (Bennett and Pope 1960, pp. 194-198) and below the low tide. They would have to have been dived for most of the time, and this accords well with the descriptions of Labillardière (12 February, 1792) and Robinson (9 June, 1829) in south-east Tasmania of women and girls repeatedly diving into deep water for large 'sea ears,' which they separated from the rocks with wooden points or spatulae. Almost every *Subninella* had been broken, and in some hearths there was a large number of burnt operculae.

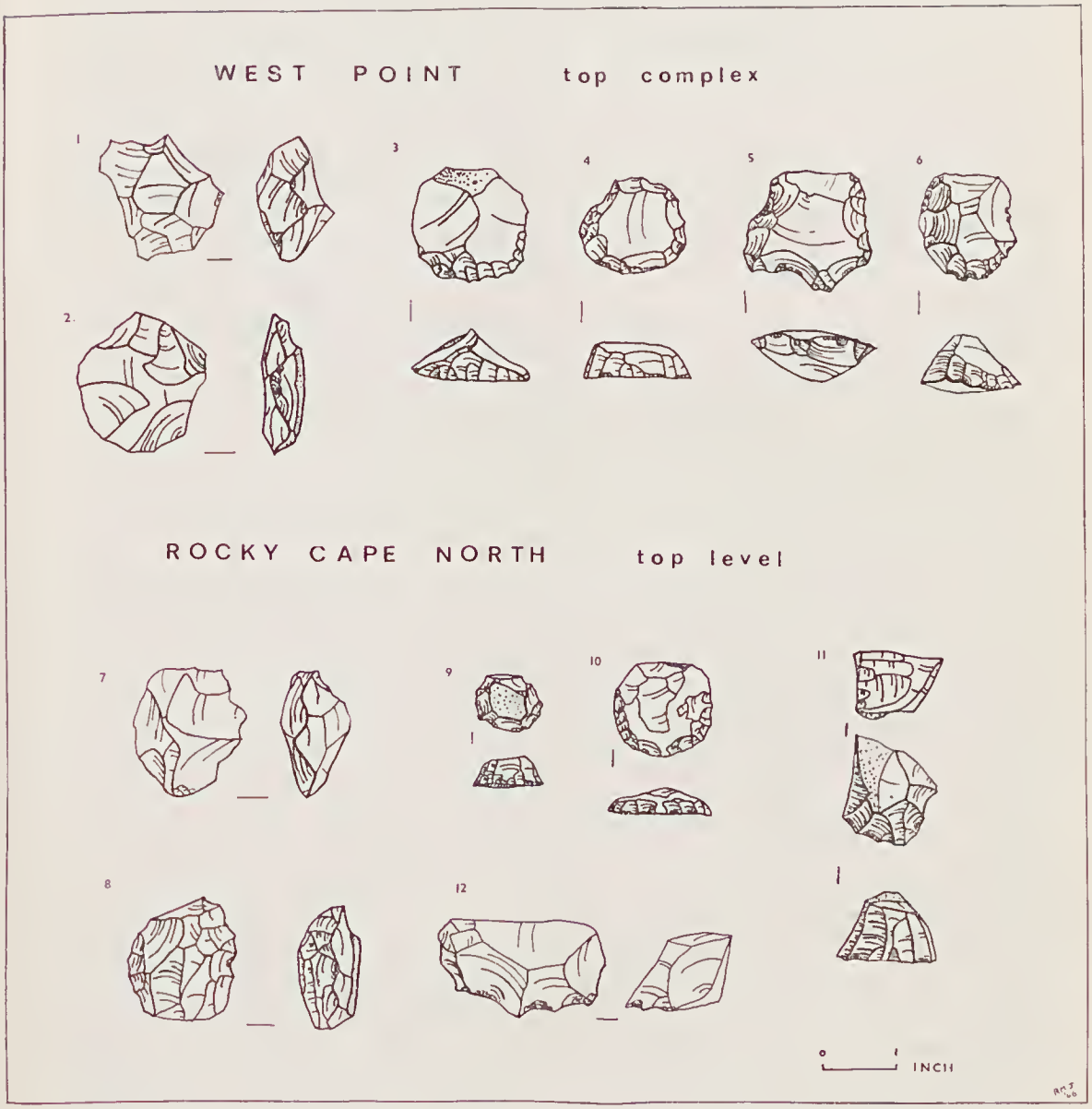

Fig. II.

Drawings of some stone artifacts recovered from a stratified context.

(Side view of specimen 5 inadvertantly drawn upside down).

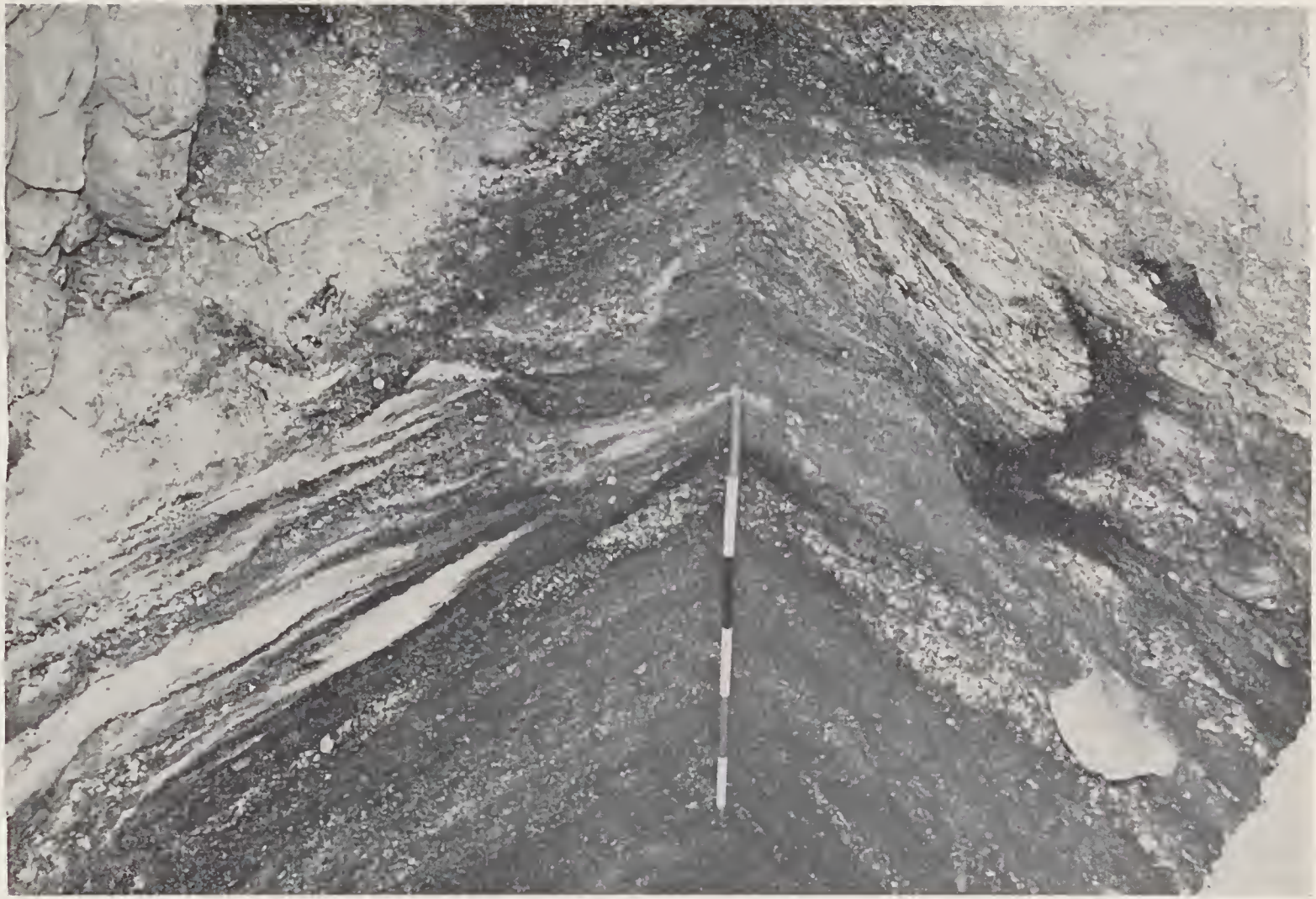

Plate 1. Rocky Cape, South. Looking at the north corner of the excavations. The bottom five feet belong to the "lower complex" and the top four feet belong to the "top complex."

Plate 2.
West Point. General view of the trenches, looking north-west.

Plate 3. West Point. Close-up of a corner between my two trenches. The bottom five are sandier than the top three feet at the corner.

I have sampled 10% of my spits for a preliminary study of the bones. In the top complex. from a minimum number of 118 individuals, 45% are bird, 23% seal, 17% macropod, 7% lizard, and below 4% each of rat kangaroo, possum, bandicoot, rat, native cat, Tasmanian Devil and whale. If we calculate roughly for meat poundage, using the same figures as for Rocky Cape, we find that seal contributed 75% of the meat, macropod 20% and bird 3%. The seals here were much bigger than at Rocky Cape, and a figure of 100 pounds of meat per animal is a conservative estimate. Using the latter figure, seal would have contributed over 80% of the non-shellfish meat.

Almost all of the seals at West Point were Southern Elephant Seals (*Mirounga leonina*),[8] but there were a few jaws and teeth of Fur Seals (*Arctocephalus* sp.). The elephant seals have a wide distribution across the Antarctic ocean, and the closest they are found to Tasmania at present is at Macquarie Island (Carrick and Ingham 1962 *a*, p. 90). Their past distribution has been noted on King Island in the Bass Strait (Péron and Lesueur 1807-1816, plate XXII), and a single breeding female has been reported on the west coast (Davies undated, p. 6), but at West Point, there is direct evidence of former large numbers of elephant seal on the Tasmanian coast.

In order to get an idea of the age of the individual elephant seals, I have compared some of the canine teeth from the excavations with photographs of equivalent teeth from known aged individuals (Carrick and Ingham 1962 *b*, plates 2 and 3). All the specimens from West Point and Rocky Cape were of young animals. There were some teeth corresponding to animals less than three months old, but there were also teeth from older animals of up to three or even five years old. The teeth of both males and females were present. At Macquarie Island, where the annual cycle of the elephant seal has been studied (Carriek, Csordas, Ingham and Keith 1962), each age and sex has its own regular sequence of seasonal activities, (pp. 130-131), and there is a well marked ebb and flow of the population throughout the year. In general, the shore population has three peaks, namely a breeding season for adult females and breeding bulls in spring betwen August and early November, the pups being born in September and going to sea in Decemher; a moulting season first for immature animals and later for mature animals from November to April; and a winter "haul out" for immature animals from March to August. This seasonal cycle is closely adhered to throughout the present geographical range of the speeies (*op. cit.*, p. 151), though Paulian (1954, p. 377), quoting early records, suggests that the hreeding season at King Island was between July and August. At West Point all the animals killed were immature so, if we assume that the annual cycle was basically similar to that outlined above, then the available periods for hunting would have been in early summer for the newly born pups, mid-summer for moulting immature animals from two to four or five years old, and early and mid-winter for hauled out immature animals from six months to about three or four years old. From the teeth of very young pups, the site was at least occupied in early summer, though it is probable that the young seal population was also exploited at the other availahle periods.

In my excavations, there was a minimum number of 300 seals and, extrapolating to the whole site, there must have been several thousand seals killed at West Point. Inspection of many wind-eroded middens along the coast, shows a similar high density of seal bones. Thus on the west coast, we have evidence of large scale prehistoric sealing activities based on the elephant seal. At the north coast sites, elephant and fur seals were an important item of diet at Rocky Cape, and fur seal supplemented the diet at Sisters' Creek. This contrasts sharply with the ethnographic literature, where there are only two published eye witness reports of Tasmanian aboriginal sealing, namely those of Kelly in January 1816 at Georges Rocks (Bowden 1964, pp. 40-41, 106-108), and Robinson on 10 February 1830 at Cox Bight, though Robinson also records story telling of sealing exploits in south west Tasmania (15 July and 15 December, 1831).

It is possible that the European sealing activities in the Bass Strait begun in 1798 had totally disrupted the aboriginal sealing economy by the time that the aborigines were observed by Robinson and his contemporaries. Most of the European sealing records refer to the taking of fur seals, over 100,000 seal skins being brought back to Sydney between 1800 and 1806 (Bowden 1964, p. 5), and Plomley (1966, p. 1006) says that the elephant seal was not of local importance because "the hunting of seals for their oil was largely neglected in the straits". However, Boys (1959, p. 28) says that in 1799, a vessel called the Martha reached King Island and "obtained a good return of skins and sea elephant oil". Crowther (1937, p. 79) says that by the time of Kelly's voyage to the Bass Strait in 1813, "the sea elephants of King Island had been practically exterminated". Certainly on Maequarie Island, sealers such as Kelly extensively exploited the sea elephants for their oil (Crowther 1933); Bowden 1964, p. 14). Possibly the Bass Strait sea elephant population became extinct very quickly under the combined impact of Aboriginal and European exploitation. Another possible explanation for the discrepancy between the archaeological and ethnographic accounts, is that the aborigines themselves had caused the extinction of the elephant seal on the Tasmanian mainland in prehistoric times. We need carbon dates for the latest phase of aboriginal sealing to help solve this problem.

The bird remains at the site were mostly coastal birds, including gulls, petrels, albatrosses and mutton birds. Also present were hawks and ducks. There was a notable absence of fish from the midden, for out of over 20,000 bones recovered, only four or five were of fish.

Together with the exploitation of marine foods, there was a steady significant contribution from the land,[9] and all the species of land animals found in the midden can be found at the present day in the immediate vicinity. This fauna belongs to the coastal sedgeland environment, and the evidence from the excavations suggests that the sedgeland, be it a pyrogenic artifact of the Tasmanians or not, has existed at West Point at least since the time of formation of the midden.

On all the criteria that I have used at Rocky Cape, I can correlate the cultural remains from West Point with those from the top levels at Rocky Cape

8. I wish to thank Mr. Basil Marlow of the Australian Museum for identifying the seal bones.

9. According to the ethnographic record, vegetable foods from both the land and the sea were a significant part of the diet (Hiatt 1965, table C, ff. p. 79), but unfortunately no traces of these were found in the midden.

North. I suggest that in general terms, these two were contemporary. Reber (1965, p. 266) dug a small slit trench on the north west side of the midden at West Point. From the base of this, seven feet from the surface, he took a carbon sample which gave a date of 2,350 ± 266 B.P. I have not correlated Reber's trench with my own excavations. South of the lighthouse is another similar midden, from the base of a four foot deep trench cut into the side of which Reber obtained a date of 2,600 ± 120 B.P. From what I could judge by inspection of the section of this cut, its contents were similar to the first midden.

Human Remains.

In the present state of speculation concerning the racial affinities and origin of the Tasmanian aborigines (Birdsell 1949, p. 120; Macintosh and Barker 1965, pp. 47-55), there is an urgent need for prehistoric human remains from Tasmania. We were fortunate to discover some at West Point. There were several single teeth in the midden, and a lower right second molar described by Macintosh and Barker (1965, pp. 56-66) belonging to an adult, probably male, was heavily worn, and had severe erosion of the roots due to periodontal disease. In the sand between the top and bottom complexes, we found two small pits filled with burnt and broken human bones, and at the base of the lower complex, there was another similar pit. There were fragments of skulls and post cranial material. Some of these, although burnt, were in good condition. Altogether, there were several individuals represented, and a detailed anatomical description is being prepared by Mr. A. G. Thorne[10]. Apart from their anatomical value, these finds give some information about prehistoric burial customs at the site. The evidence points to burning under conditions which did not allow complete incineration of the bone. The bones were then in some cases broken systematically, and collected together with charcoal, and deposited in little pits eighteen inches wide and twelve inches deep dug into sand or sandy midden. This may have occurred on the site, because there was a wide scatter of burnt human fragments, charcoal and black sand near two pits, and in most cases, the edges of the burnt broken bones were unabraded. In one pit were the foot bones of several wallabies, and the claws of a large hawk. In another were 30 small and two large shells, each pierced with a small circular hole. Following ethnographic specimens (Plomley 1962, p. 10-12; Ling Roth 1899, p. 132), I suggest that the shells and also the animal's feet were parts of necklets of some sort, placed with the ashes of the diseased as grave goods.

There seems to have been some variety in the burial customs of the Tasmanian Aborigines. In some cases, bodies were buried or abandoned without any visible treatment (Crowther 1939; Lord 1919; Crowther 1942, p. 91), in other cases relatives carried dessicated flesh or ashes in little bags (Ling Roth 1899, p. 64; Pulleine 1924; Plomley 1962, pp. 10-11). There is also evidence for the widespread occurrence of cremation. According to Robinson's magnificent descriptions (e.g., 31 May, 1829; 30-31 July, 1832), the body was arranged or bound in a flexed position, placed on a small frame with firewood all round, and then burnt. The unburnt fragments were broken and poked with poles and then [they] "carefully scraped the ashes together and mixed sand with it, and then laid some grass over it." (Robinson, 31 July, 1832). Labillardière (12 May, 1792) found the ashes of a fire with burnt and broiled fragments of human bone and flesh in it. In 1802, on Maria Island, Péron (1807-1816)[11] found a wigwam of bark under which was a circle of stones holding down a flattened cone of plaited grass. This grass covered a circular pit 15 to 18 inches in diameter and 8 to 10 inches deep, containing burnt and broken fragments of human bone, some still containing calcined blood. The following day, he found a similar grave, with drawings on the inside of the bark wigwam but, in this case, the structure had decayed a great deal, and Péron noted that in a short time these graves would look like old fireplaces. Crowther (1934) found burned fragments of human bone in little black depressions in sand at Sandford, and he said that "it is difficult to account for the broken down condition of these bones, except by deliberate fractures following partial incineration". Digging further, he found part of the left side of the skeleton, flexed and unburned, and he inferred that the body, having been treated as in Robinson's account (31 May, 1829), had fallen over before incineration.

The finds from West Point are fully consistent with this evidence for cremation, and in turn extend the traditions back to the time of the foundation of the midden.

Conclusion

By correlating the preliminary analyses of the contents of the four sites just described, I am in a position to set up a speculative sequence for the north-west corner of Tasmania. It is a hypothesis based on two major assumptions: firstly, that my excavations are a good sample of my sites and my sites a good sample of the area and, secondly, that my relative dating scheme is in general confirmed by radio carbon dating.[12]

At about eight or nine thousand years ago, the sea in its post glacial rise reached approximately the present coastline on the north coast near Rocky Cape (Godwin, Suggate and Willis 1958; Hails 1965, p. 67; Jennings 1959 *b*, map p. 50). People living in a fairly confined coastal strip arrived at the cave and occupied it for the first time. They had a coastal economy, eating shellfish, seal and parrot-fish, but some land animals were also eaten. The stone industry was unspecialised, involving the manufacture of only crude cutting and smashing implements. For raw materials, they used readily available, rough, raw material. They had a sophisticated bone industry. This phase is represented by the lower complex in Rocky Cape South, and the lowest two feet of Rocky Cape North.

Some time after this, we begin to see some changes especially in the exploitation of better stone raw materials, the knowledge of which would have involved a great deal of casual exploration. In addition to simple retouched flakes and pebbles, some well made tools were used. The dietary economy had not changed very much with shellfish, parrot-fish, seal and land animals being eaten. Sisters' Creek cave was first occupied during this phase about 6,000 years ago, and Rocky Cape South was filling up.

10. Department of Anatomy, University of Sydney. I wish to thank Mr. Thorne for the information concerning the human anatomical material.

11. Chapter XIII, pp. 265-273; see also Roth 1899, pp. 116-118.

12. My carbon samples are being dated by Miss A. Bermingham, Institute of Applied Science, Melbourne.

The next phase is represented by the top levels of Rocky Cape North and the West Point midden. By this time fish had dropped out of the diet, and well finished bone tools were no longer made. The meat dietary economy was still orientated towards the sea, although a wide range of land animals was actively exploited. Sealing was of great importance, especially on the west coast where very large sites such as West Point implied a specialised exploitation of young seals, probably seasonally. Quarries of good raw material were well known and the tool makers were very selective in their choice of raw materials, using only the best material in sites close to the sources, and importing either blanks or finished tools in sites far from the source. The range of small, well-made tools implies specialised uses for them, and possible functions may include cutting and wood scraping. During this phase, people were cremated, and their remains broken and buried in little pits. In some cases, these were accompanied by pierced shells and animals' feet. Dates from the west coast middens suggest that this phase might be at least 2,000 years old. The last phase was the "ethnographic present" which, with its diet, seasonal exploitation of foods, exploitation of good ochre and stone material, and burial practices, seemed to be similar to the latest prehistoric phase. One difference was the absence of sealing, which had probably been disrupted by European sealers.

If this hypothetical sequence is supported by carbon-14 dating and further analysis, the next question to ask is how general is it. Is it valid for the whole of Tasmania, or only for the north-west corner?

In the sequence, both parrot-fish and bone tools are present in the lower part, but are absent in the top part. Ethnographically, there is not a single reliable observation of the Tasmanian Aborigines eating scale fish (Hiatt 1965, pp. 53-57), and no bone tools were seen either being manufactured or used.[13] It is interesting to speculate whether or not this absence may be explained in terms of discontinuity through time,[14] and here the sequence may have validity throughout Tasmania. On the other hand, given the fact that well differentiated stone industries are known on the mainland which are older than 10,000 B.P., and which bear some morphological resemblance to Tasmanian assemblages (Mulvaney and Joyce 1965, p. 207), it is highly unlikely that all the first migrants to Tasmania were ignorant of sophisticated stone tool manufacture, and then independently invented their own traditions. It is more likely that the traditions of stone tool making continued unbroken in some part of the island, and in this respect, possibly because of the effect of the rain forest, the north-west might have been a fringe zone to the main area of early occupation.

I see the sequence in the north west as documenting a gradually improving exploitation of an environment which may have been unfamiliar and inhospitable to the first comers pushed back into new territory by the post glacial rising sea.

13. There were, however, wooden points and spatulae.

14. The dichotomy between the presence of fish bones at Rocky Cape and the absence of references to fish in the ethnographic record, has also been explained in terms of a taboo against fish eating in most parts of the island except in the north-west (Gill and Banks 1956, p. 38; Meston 1956, p. 198; Plomley 1966, p. 36 note 22). Another explanation offered was that the parrot-fish had been carried up to the midden by chance, e.g., by people collecting mutton-fish, crayfish or kelp (Kemp 1963, p. 243).

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